

IN THE CLAIMS

The following is a listing of the claims in the present application:

Claim 1. (Previously Presented) A surface having ultraphobic properties, comprising a surface topography in which the value of the integral of a function S

$$S(\log f) = a(f) \cong f \quad (1),$$

which gives a relationship between the spatial frequencies f of the individual Fourier components and their amplitudes a(f), is at least 0.5 between the integration limits

$\log(f_1/\Phi m^{-1}) = -3$ and $\log(f_2/\Phi m^{-1}) = 3$, wherein said surface comprises a hydrophobic or oleophobic material, or is coated with a hydrophobic or oleophobic material.

Claim 2. (Previously Presented) The surface according to Claim 1, wherein the integral is > 0.6.

Claim 3. (Previously Presented) The surface according to Claim 1, wherein said surface has a contact angle of at least 150° and a roll-off angle of <10°.

Claim 4. (Previously Presented) The surface according to Claim 1, wherein said surface has a contact angle of at least 155°.

Claim 5. (Previously Presented) The surface according to Claim 1, wherein said surface comprises metal, plastic, glass or ceramic.

Claim 6. (Previously Presented) The surface according to Claim 1, wherein said surface comprises metal and is selected from the group consisting of beryllium, magnesium, scandium, titanium, vanadium, chromium, manganese, iron, cobalt, nickel, copper, zinc, aluminum, gallium, yttrium, zirconium, niobium, molybdenum, technetium, ruthenium, rhenium, palladium, silver, cadmium, indium, tin, lanthanum, cerium, praseodymium, neodymium, samarium, europium, gadolinium, terbium, dysprosium, holmium, erbium, thulium, ytterbium, lutetium, hafnium, tantalum, tungsten, rhenium, osmium, iridium,

platinum, gold, thallium, lead, bismuth, titanium, aluminium, magnesium, nickel and alloys thereof.

Claim 7. (Previously Presented) The surface according to Claim 1, wherein said surface comprises metal and is an aluminium-magnesium alloy.

Claim 8. (Previously Presented) The surface according to Claim 1, wherein said surface comprises plastic and is a thermosetting or thermoplastic polymer.

Claim 9. (Previously Presented) The surface according to Claim 1, wherein said surface comprises a thermosetting polymer and is selected from the group consisting of diallyl phthalate resins, epoxy resins, urea-formaldehyde resin, melamine-formaldehyde resin, melamine-phenol-formaldehyde resin, phenol-formaldehyde resin, polyimides, silicone rubbers, unsaturated polyester resins and mixtures thereof.

Claim 10. (Previously Presented) The surface according to Claim 1, wherein said surface comprises a coating of a hydrophobic phobicization auxiliary.

Claim 11. (Withdrawn) Material or construction material comprising an ultraphobic surface according to Claim 1.

Claim 12. (Withdrawn) A friction-reducing lining of vehicle bodies, aircraft fuselages or hulls of ships comprising the ultraphobic surface as claimed in claim 1.

Claim 13. (Withdrawn) A self-cleaning coating or panelling of building structures, roofs, windows, ceramic construction material comprising the ultraphobic surface claimed in Claim 1.

Claim 14. (Withdrawn) An antirust coating of metal objects comprising the ultraphobic surface claimed in Claim 1.

Claim 15. (Withdrawn) A transparent sheet or a topcoat of transparent sheets comprising the ultraphobic surface claimed in Claim 1.

Claim 16. (Withdrawn) Process for the preparation of a surface having ultraphobic properties according to claim 1 based on an AlMg₃ alloy, comprising cleaning, pickling, anodically oxidating, passivating in boiling water, and optionally coating with a noble metal as an adhesion promoter, and coating with a hydrophobic material.

Claim 17. (Withdrawn) Process for the preparation of a surface having ultraphobic properties comprising molding, wherein a mould, which has the negative of a surface topography suitable for an ultraphobic surface, is moulded with a mixture of a plastic and a hydrophobic additive, which separates out upon curing as a thin film between the surface of the mould and the plastic moulding.

Claim 18. (Withdrawn) Process for the preparation of a surface having ultraphobic properties comprising moulding a surface of a positive mould, which has a surface structure suitable for an ultraphobic surface, with a plastic, and the surface of the resulting moulding having the negative impression of the surface of the positive mould is optionally provided with an adhesion promoter layer and then with a hydrophobic coating.

Claim 19. (Withdrawn) Process according to Claim 18, wherein the plastic is a hydrophobic polymer, and the additional coating with hydrophobic or oleophobic material is optionally omitted.

Claim 20. (Withdrawn) Process according to Claim 17, wherein the mould is the negative of the surface structure of a pickled, anodized surface consisting essentially of aluminium or an aluminium alloy and treated with hot water at from 50 to 100°C.

Claim 21. (Withdrawn) Process according to Claim 17, wherein the mould is the negative of the surface structure of a microstructured, anodized, calcined surface consisting essentially of aluminum or an aluminium alloy.

Claim 22. (Withdrawn) Process according to Claim 17, wherein the plastic used for the moulding is a thermosetting polymer or a thermoplastic polymer.

Claim 23. (Withdrawn) Process according to Claim 22, wherein the thermosetting polymer is selected from the group consisting of diallyl phthalate resin, epoxy resin, urea-formaldehyde resin, melamine-formaldehyde resin, melamine-phenol-formaldehyde resin, phenol-formaldehyde resin, polyimide, silicone rubber and unsaturated polyester resin.

Claim 24. (Withdrawn) Process according to Claim 22, wherein the thermoplastic polymer is selected from the group consisting of thermoplastic polyolefin, polypropylene, polyethylene, polycarbonate, polyester carbonate, polyester, PBT, PET, polystyrene, styrene copolymer, SAN resin, rubber-containing styrene graft copolymer, ABS polymer, polyamide, polyurethane, polyphenylene sulphide, polyvinyl chloride and mixtures of said polymers.

Claim 25. (Withdrawn) Process according to Claim 17, wherein the surface of the moulding with the impression has a coating with a hydrophobic phobicization auxiliary, or phobicization auxiliary which hydrophobicizes the surface, used as additive to polymers compatible therewith.

Claim 26. (Withdrawn) A method of testing a surface for ultraphobic properties, comprising coating the surface with a noble metal or GaAs as adhesion promoter, further coating with a phobicization auxiliary, then analyzing the surface topography and, from the measured data, the spatial frequencies f and their structure amplitudes $a(f)$, and the integral of the function S

$$S(\log F)=a(f)\approx f \quad (1)$$

calculated between the integration limits $\log(f_1/\Phi m^{-1})=-3$ and $\log(f_2\Phi m^{-1})=3$ is formed.

Claim 27. (Previously Presented) The surface according to Claim 1, wherein said surface comprises a thermoplastic polymer and is selected from the group consisting of polyolefins, polypropylene, polyethylene, polycarbonates, polyester carbonates, polyesters, PBT, PET, polystyrene, styrene copolymers, SAN resin, rubber-containing styrene graft

Application No. 09/869,123
Reply to Office Action of October 19, 2006

copolymers, ABS polymer, polyamides, polyurethanes, polyphenylene sulphide, polyvinyl chloride and mixtures thereof.

Claim 28. (Previously Presented) The surface according to claim 1, wherein said surface comprises a coating of a hydrophobic phobicization auxiliary which comprises a group which is an anionic, cationic, amphoteric or nonionic, interface active group.

Claim 29. (Withdrawn) The self-cleaning coating or panelling of building structures, roofs, windows, ceramic construction material claimed in Claim 13 for sanitary installations and household applicances.

Claim 30. (Withdrawn) The transparent sheet of Claim 15 used as a sheet or top-coating in glass or plastic.

Claim 31. (Withdrawn) The transparent sheet of Claim 15 used as a sheet or top-coating for solar cells, vehicles, or greenhouses.

Claim 32. (Withdrawn) The process of Claim 16, wherein the noble metal coating is gold with a layer thickness of from 10 to 100 nm.

Claim 33. (Withdrawn) The process of Claim 32, wherein the coating is prepared by atomization.

Claim 34. (Withdrawn) The process of Claim 16, wherein the hydrophobic material is a phobicization auxiliary selected form the group consisting of anionic, cationic, amphoteric, and nonionic interface active compounds.

Claim 35. (Withdrawn) The process claimed in Claim 17, wherein the hydrophobic additive is oleophobic.

Claim 36. (Withdrawn) The process as claimed in Claim 18, wherein the plastic is a thermosetting or thermoplastic polymer.

Claim 37. (Withdrawn) The process as claimed in Claim 18, wherein the hydrophobic coating is oleophobic.

Claim 38. (Withdrawn) The process as claimed in Claim 19, wherein the hydrophobic polymer is poly(methyl)methacrylate-co-perfluorooctadecyl methacrylate.

Claim 39. (Withdrawn) Process according to Claim 18, wherein the mould is the positive of the surface structure of a pickled, anodized surface consisting essentially of aluminium or an aluminium alloy and treated with hot water at from 50 to 100°C.

Claim 40. (Withdrawn) Process according to Claim 18, wherein the mould is the positive of the surface structure of a microstructured, anodize, calcined surface consisting essentially of aluminum or an aluminium alloy.

Claim 41. (Withdrawn) Process according to Claim 18, wherein the plastic used for the moulding is a thermosetting polymer or a thermoplastic polymer.

Claim 42. (Withdrawn) Process according to Claim 41, wherein the thermosetting polymer is selected from the group consisting of diallyl phthalate resin, epoxy resin, urea-formaldehyde resin, melamine-formaldehyde resin, melamine-phenol-formaldehyde resin, phenol-formaldehyde resin, polyimide, silicone rubber and unsaturated polyester resin.

Claim 43. (Withdrawn) Process according to Claim 41, wherein the thermoplastic polymer is selected from the group consisting of thermoplastic polyolefin, polypropylene, polyethylene, polycarbonate, polyester carbonate, polyester, PBT, PET, polystyrene, styrene copolymer, SAN resin, rubber-containing styrene graft copolymer, ABS polymer, polyamide, polyurethane, polyphenylene sulphide, polyvinyl chloride and mixtures of said polymers.

Claim 44. (Withdrawn) Process according to Claim 18, wherein the surface of the moulding with the impression has a coating with a hydrophobic phobicization auxiliary, or phobicization auxiliary which hydrophobicizes the surface, used as additive to polymers compatible therewith.

Claim 45. (Withdrawn) The process according to Claim 17, wherein the hydrophobic auxiliary is an anionic, cationic, amphoteric, or nonionic interface active compound.

Claim 46. (Withdrawn) The process according to Claim 18, wherein the hydrophobic auxiliary is an anionic, cationic, amphoteric, or nonionic interface active compound.

Claim 47. (Withdrawn) The method claimed in Claim 26, wherein said surface is coated by vapor deposition.

Claim 48. (Withdrawn) The method claimed in Claim 26, wherein the adhesion promoter is gold.

Claim 49. (Withdrawn) The method claimed in Claim 48, wherein the gold layer has a thickness of 10 to 100 nm.

Claim 50. (Withdrawn) The method claimed in claim 26 wherein the phobicization auxiliary is decanethiol.

Claim 51. (Withdrawn) The method claimed in Claim 26, wherein the surface topography is analyzed with a combination of scanning tunneling microscopy, scanning atomic force microscopy, and/or white light interferometry.

Claim 52. (Previously Presented) A surface having ultraphobic properties, comprising a surface topography in which the value of the integral of a function S

$$S(\log f) = a(f) \cong f \quad (1),$$

which gives a relationship between the spatial frequencies F of the individual Fourier components and their amplitudes a(f), is at least 0.5 between the integration limits $\log(f_1/\mu\text{m}^{-1})=-3$ and $\log(f_2/\mu\text{m}^{-1})=3$, wherein said surface comprises a hydrophobic material, or is coated with a hydrophobic material.

Claim 53. (Previously Presented) A surface having ultraphobic properties, comprising a surface topography in which the value of the integral of a function S

$$S(\log f) = a(f) \cong f \quad (1),$$

which gives a relationship between the spatial frequencies F of the individual Fourier components and their amplitudes a(f), is at least 0.5 between the integration limits $\log(f_1/\mu\text{m}^{-1})=-3$ and $\log(f_2/\mu\text{m}^{-1})=3$, wherein said surface comprises an oleophobic material, or is coated with an oleophobic material.

Claim 54. (Previously Presented) The surface according to claim 1, wherein said surface comprises a metal and is AlMg₃.